AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1   1-21 (Canceled).

1   22. (Currently amended) A computer ~~An computer~~ system for solving an
2   interval global optimization problem specified by a function f and a set of equality
3   constraints, the computer system comprising:
4   a processing unit;
5   a memory;
6   an interval arithmetic unit within the processing unit, wherein the interval
7   arithmetic unit is configured to receive floating-point numbers representing a first
8   endpoint and a second endpoint for a first interval and floating-point numbers
9   representing a first endpoint and a second endpoint for a second interval, and is
10   configured to ~~simultaneously~~ perform arithmetic operations to produce a first
11   endpoint and a second endpoint representing a resulting interval;
12   wherein computational code within the memory is configured to perform
13   an interval global optimization process to compute guaranteed bounds on a
14   globally minimum value of the function $f(x)$ subject to the set of equality
15   constraints;
16   wherein the interval global optimization process is configured to,
17   apply term consistency to the set of equality constraints
18   over a subbox X, and to

19   exclude portions of the subbox **X** that can be shown by

20   using term consistency to violate any of the equality constraints.

1   23. (Previously presented) The computer-system of claim 22,

2   wherein the interval arithmetic unit includes a first input, wherein the first

3   input includes a first floating point number representing a lower bound of the first

4   input and a second floating point number representing an upper bound of the first

5   input; and

6   wherein the interval arithmetic unit includes a second input, wherein the

7   second input includes a third floating point number representing a lower bound of

8   the second input and a fourth floating point number representing an upper bound

9   of the second input.

1   24. (Previously presented) The computer-system of claim 22, wherein the

2   optimizer is configured to:

3   precondition the set of equality constraints through multiplication by an

4   approximate inverse matrix **B** to produce a set of preconditioned equality

5   constraints;

6   apply term consistency to the set of preconditioned equality constraints

7   over the subbox **X**; and to

8   exclude portions of the subbox **X** that can be shown to violate any of the

9   preconditioned equality constraints.

1   25. (Previously presented) The computer-system of claim 22, wherein the

2   optimizer is configured to:

3   keep track of a least upper bound f_bar of the function $f(\mathbf{x})$;

4   unconditionally remove from consideration any subbox for which

5       $inf(f(\mathbf{x})) > f\_bar$;

3

1   apply term consistency to the inequality $f(\mathbf{x}) \le f\_bar$ over the subbox $\mathbf{X}$;

2 and to

3   exclude portions of the subbox $\mathbf{X}$ that violate the inequality.

1   26. (Previously presented) The computer-system of claim 22, wherein the

2 optimizer is configured to:

3   apply box consistency to the set of equality constraints $q_i(\mathbf{x}) = 0$ $(i=1,...,r)$

4 over the subbox $\mathbf{X}$; and to

5   exclude portions of the subbox $\mathbf{X}$ that violate the set of equality

6 constraints.

1   27. (Previously presented) The computer-system of claim 22, wherein the

2 optimizer is configured to:

3   evaluate a first termination condition;

4   wherein the first termination condition is TRUE if a function of the width

5 of the subbox $\mathbf{X}$ is less than a pre-specified value, ε_X, and the absolute value of the

6 function, f, over the subbox $\mathbf{X}$ is less than a pre-specified value, ε_F; and to

7   terminate further splitting of the subbox $\mathbf{X}$ if the first termination

8 condition is TRUE

1   28. (Previously presented) The computer-system of claim 22, wherein the

2 optimizer is configured to perform an interval Newton step on the John

3 conditions.